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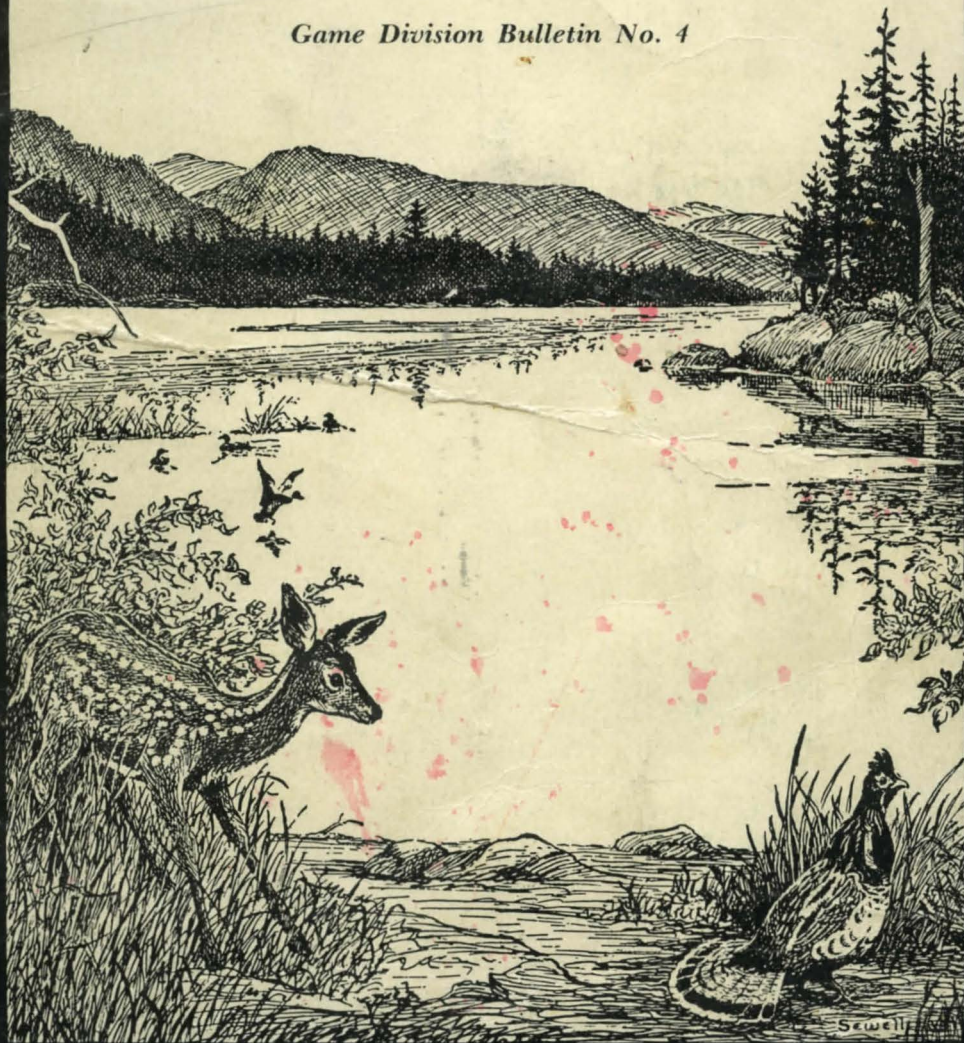
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THE BLACK BEAR AND ITS STATUS IN MAINE

Game Division Bulletin No. 4



STATE OF MAINE
DEPARTMENT OF
INDUSTRY, FISHERIES AND GAME

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THE BLACK BEAR

and

ITS STATUS IN MAINE

by

HOWARD E. SPENCER, JR.

Submitted to
ROLAND H. COBB
Commissioner

Department of Inland Fisheries and Game
Augusta, Maine

Third Edition
June, 1961

(Final Report of a Portion of Federal Aid to
Wildlife Restoration Project W-37-R)



Figure 1. A fine trophy bear shot in Franklin County
(Photograph by the author)

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INTRODUCTION

The black bear (*Euarctos americanus americanus* Pallas) probably has more popular and romantic appeal than any other species of North American wildlife. To most people the bear truly symbolizes the deep woods and wilderness. Something of its general habits and characteristics are known to every school youngster.

Despite the nearly universal popularity of the black bear among the general public, there exist many varied and controversial opinions among those who become more closely associated with the animal. When a thriving bear population develops in a state such as Maine which derives about 12 million dollars in revenue annually from hunter expenditures alone, the economic status and management of the species becomes important (Fellows, 1954). Particularly is this true when considered in conjunction with some of Bruin's more displeasing habits of killing livestock and raiding camps.

It was undoubtedly with these facts in mind that members of the 1952-54 Maine Legislature requested a bear investigation that would provide a basis for sound legislative action pertinent to management of Maine bear resources.

Present Maine game laws indirectly class the bear as a predatory species. Actually no laws exist pertinent to bears specifically with the one exception of the bounty law.

Subsequent to this legislative request, Commissioner Roland H. Cobb directed the Game Division to conduct such a study which would have the following objectives:

1. To determine the distribution of bears within the State.
2. To study factors influencing the Maine bear population.
3. To estimate the size of Maine bear population.
4. To analyse the economic status of the bear in Maine.
5. To formulate reasonable and practical recommendations for the sound management of Maine bears.

To achieve these objectives the present study, under the Federal Aid to Wildlife Restoration Act, was conducted between July 1, 1953 and October 1, 1954. The investigation was state-wide in scope with emphasis in sections having greater bear densities.

Although the project was of relatively short duration, the 12 regional game biologists assigned to the field work did amass considerable data throughout the bear range within the State. This publication repre-

sents the collation and analysis of their data and constitutes the final report of the bear study. It has been kept as non-technical as possible in order to be of interest and value to all concerned.

Before contemplating the actual findings of the study it is interesting to consider the problem which faced the investigators. At the very outset the question arose as to how and what techniques and methods should be employed to achieve the desired objectives. Since there is a relative paucity of concrete information regarding the bear, there existed neither a known guide nor any demonstrated techniques which could be followed. Thus, the Game Division was forced to rely on its own initiative. Some phases of the work, such as the economic analysis and damage studies, were greatly facilitated by related Pittman-Robertson studies already in progress or completed. Other aspects, such as determination of abundance, distribution, food habits and rate of increase, required designing of experimental techniques.

Perhaps the most significant outcome of the investigation was the finding that the bounty on bears accomplished no desirable objective and constituted an unnecessary expense to the State. It is hoped that this and other findings of the study will promote a better understanding of and more sound management for Maine bear resources.

LIFE HISTORY

General Discussion

A description of the black bear would appear superfluous in discussing such a widely known species. Other aspects such as its typical life cycle are not as well understood. For instance, the tremendous size discrepancy between a female bear and her newborn offspring is not generally appreciated. A 300 pound bear may produce a cub weighing only 12 ounces at birth. This would be equivalent to a human mother of say 110 pounds giving birth to a child weighing only 4½ ounces.

From 1 to 4 cubs are born in mid-winter while the female is in her den. Naked and helpless at birth, they grow rapidly and may weigh from 5 to 10 pounds when they emerge from the den about 3 months later. Usually, the cubs travel with the mother throughout the first year and even den with her during the first winter after birth. Since it is generally believed that bears do not breed until over 2 years old, and then usually every other year, there is likely little conflict with new cubs during this first winter. The cubs usually associate with the mother until the mating season during June and July at which time the 1½-year-olds depart on their own while she seeks a mate. The forsaken 2-year-olds wander and den alone or as litter mates during the second winter. As far as is known they reach breeding maturity the following summer and the cycle resumes (Cahalane 1947, Seton 1928).

Mating Habits

There are several reliable records of cubs born in Maine in mid-January. Utilizing the accepted gestation period of 7-7½ months (Matson, 1954) one deduces a breeding date in mid-June. Matson (1954) reports the birth of young on January 3-4 in Pennsylvania. Apparently, May, June, or July, depending on latitude, are the primary months of mating activity.

Birth and Growth

It is believed that the majority of cubs are born in Maine during mid-January. A record of a litter found January 27, 1943 (Smith, 1946) near Calais, Maine, consisted of 2 male and 1 female cubs. One cub was about 9 inches long and weighed 1 pound 4 ounces; the other two were 8 inches long and weighed 1 pound 2 ounces each. These cubs were at least several days old. Another female with a litter of

3 cubs was taken near Upton, Maine on February 27, 1954. These cubs were well developed and weighed $4\frac{1}{2}$, $4\frac{1}{4}$, and $4\frac{1}{4}$ pounds respectively. They were estimated to be at least 1 month old when taken.

By the time the cubs leave the den at about 3 months of age, they probably weigh between 5 and 8 pounds. Two records are on hand for very small cubs taken in Maine in the course of the project. The smallest was an apparently abandoned female from Aroostook County weighing 3 pounds when killed on May 28. Another small female cub weighing 8 pounds was taken in Oxford County on June 5. The 3 pound cub had a total length (from nose to tip of tail) of $18\frac{3}{4}$ inches. A more typical record is one of 2 male cubs from Aroostook County taken May 13 weighing 9 pounds each. The latter cubs were 22 inches in total length.

It becomes nearly impossible to follow the growth rate specifically after about 6 months. This is due largely to lack of an aging technique. Based on various factors such as date of kill, weight, and total length it appears that Maine cubs may reach a weight of 45 to 95 pounds and be 35 to 45 inches in total length by November or December. Data also indicated that yearlings emerging from the den undergo a considerable temporary weight loss which is regained rapidly prior to denning the second time. Records of animals believed to be yearlings (or more accurately $1\frac{1}{2}$ -year-olds) show live weights from 37 to 121 pounds between July and December and lengths from 41 to 54 inches.

The largest bear accurately checked during the study was a male from Aroostook County, shot September 17, 1954, weighing 403 pounds dressed. The largest female was an Oxford County specimen with a dressed weight of 310 pounds. The latter was taken in November. Several reports of bears over 400 pounds were received but accurate information was not available.

The number of cubs per litter varies from 1 to 4 in Maine. Based on 38 observations by wardens and biologists, the average litter size is 2.4 young (Table I). Some bias in these data may exist since the larger litters are more likely to be recorded or remembered.

TABLE I. LITTER SIZE OF MAINE BEARS

No. of Cubs	Frequency	Per Cent	Total Cubs
1	3	7.9	3
2	19	50.1	38
3	14	36.8	42
4	2	5.2	8
	<hr/> 38	<hr/> 100.0	<hr/> 91

Ave. 2.4 cubs/litter.

Marking Posts

A common habit of the black bear is the creation of marking posts, or as more frequently called, "bear trees". Much has been written about these "sign posts", but little is actually known about their purpose. For no discernible reason a bear will select a tree along his path and, while standing on his hind legs, make several claw or tooth marks in the bark at what appears to be his maximum reach. No particular species of tree is selected. The writer has observed bear marks on yellow birch, white birch, aspen, balsam fir, white cedar and others. Various observers believe them to be associated with territorialism, the breeding season, or simply a measuring post on which passing bears record their reach. Marks made by 2 or more bears on the same tree are not uncommon.

Unit Range

The size of the "unit" or "home" range of the individual black bear is not well known and undoubtedly varies with conditions of topography, food supply, etc. Cahalane (1947) suggests a 10 mile radius for a female with cubs (about 300 sq. mi.) and a 15 mile radius (about 700 sq. mi.) for adult males, which are usually solitary except during the breeding season. In California the average range is thought to be about 5 miles in radius or about 78 square miles (Lynn, undated). General observations in Maine indicate that the range is similar to that in California. Certainly there is much overlapping of unit ranges—apparently with very little conflict.

Hibernation or Dormancy

Though characteristically undergoing a period of prolonged dormancy, the bear is not a true hibernator in comparison with some of the burrowing rodents. The body processes such as respiration, pulse and temperature are not as reduced as in actual hibernating species. It appears rather a prolonged period of lethargy during which such normal functions as eating and excreting are discontinued.

The selection of the winter den site in Maine does not follow any specific requirements other than that it be sheltered and hidden. Dened or dormant bears have been found in Maine in coniferous swamps and flats as well as on hardwood ridges with various exposures. A pocket in rocky ledges, a natural hollow or even the shelter formed by the low hanging branches of a spruce or fir have been utilized for actual nest sites. Usually these are such that winter snows tend to improve them. Dormant bears have been located in Maine by observing steam issuing from the "smoke hole" in the snow during cold weather.

The factors causing dormancy in bears have been debated for years. At present it is quite widely accepted that satiety and obesity determine when a bear will den rather than snow depth and sub-freezing temperatures. By this token bears may be expected to den earlier in years of bountiful food supplies and to be abroad later in the fall during lean years. In 1953, a year of excellent food conditions, most bears had retired by early December. A number of verified observations of bear signs throughout the State during the first two weeks of April in 1954 indicated a general exodus from the dens about this time.

Food Habits

The diet of the black bear may best be described by saying that bears will eat nearly anything and everything that looks, smells, or tastes like food. This, of course, includes all sorts of refuse from dumps, a great variety of wild and domestic vegetable foods, fish, carrion, and both wild and domestic animals. When insects, wild fruits, and mast are abundant, these form the staples. Judging from the results of the present study, it is only an occasional individual, however, that ever develops the predatory habit.

As would be expected, the food habits vary greatly with the season. From the time of the bear's emergence from its winter den until the first berries ripen is normally the only period when food is in short supply. Grasses, sedges, herbs and insects are mainstays during this time. Garbage dumps and carrion from winter-killed animals also constitute important food sources in the spring. The summer diet consists largely of such items as blueberries, raspberries, blackberries, wild cherries and hazel nuts. When natural foods are locally scarce, bears are not averse to raiding a secluded field of ripening oats. In Virginia the bear has also developed a taste for sweet corn. Only one verified report of feeding on corn in Maine was received during the study. In the fall, beechnuts, acorns and apples become favored items. The many wild trees and semi-abandoned apple orchards furnish important food sources. The preference for sap of the Douglas Fir, common on the west coast, has not been observed as affecting any local timber species. In regard to animal matter in the bear's diet, it should be emphasized that insects are important throughout the year. Wasps, grubs, ants and bees are continually on the menu. In areas of high bear populations, it is difficult to find a rotten log or stump that hasn't been visited by bears in search of insects.

During the present investigation, food habits were studied in conjunction with other phases of the field work. Analyses of scats and stomachs were for the most part carried out in the field, and gross esti-

mates of volumes obtained. It was originally anticipated that these analyses would be broken down into only 4 categories—animal matter, insects, vegetable matter, and trash. The latter category would include dump refuse and twigs, bark, leaves, etc., ingested coincidentally with food. As the work progressed it appeared desirable to make further differentiation of food materials as listed in Table II.

Food remains in 108 stomachs and 377 scats were analyzed (Tables IIA, IIB, IIC, and Figures 2 and 3). In the table of summer food habits (Table IIB) the "unclassified vegetable matter" noted early in the project was pro-rated among the other items. This has not been done for the spring and fall since there were insufficient data to assure reasonable accuracy.

Tabulations of food habits were made on a seasonal basis to coincide with the progress of the growing season. While the spring and fall data were relatively weaker, the high volume of animal food in the spring diet was notable. Usually this was also the period of greatest damage to livestock. It reflects the general scarcity of available foods during the spring.

It was interesting to learn that of the year-round diet, only 8.1 per cent was animal matter. Of this 8.1 per cent, insects and carrion made up 7.4 per cent leaving only 0.7 per cent for all other miscellaneous animal foods including both livestock and game (Table II and Figure 3). It seems evident the latter two items form only a very minor part of the overall diet. No evidence of predation on deer was found although reports have been received which indicate that it does occur occasionally.

TABLE IIA. SPRING FOOD HABITS OF MAINE BEARS
(APRIL 16-JUNE 15)*

Food Item	Frequency	Per cent Occurrence	Per cent Volume
Animal			
Carrion	11	18.3	0.5
Insects			
Unclassified	3	5.0	1.8
Ants	7	11.6	0.6
Bees	1	1.7	Trace
Fly Larvae	2	3.3	Trace
Beetles	2	3.3	Trace
Snowshoe Hare	1	1.7	2.3
Bird Remains	2	3.3	0.9
Unclassified	2	3.3	0.5
R. Squirrel	1	1.7	Trace**
Total Animal	24	40.0	33.0

*Based on 14 stomach and 46 scat analyses—1954

**Trace—Less than 0.1%

SPRING FOOD HABITS (*Concluded*)

Food Item	Frequency	Per cent Occurrence	Per cent Volume
Vegetable			
Grass and Sedge	22	36.6	21.1
Unclassified	15	25.0	16.4
Misc. (Browse)	12	20.0	11.5
Balsam (Fir Needles)	9	15.0	3.2
Clover	1	1.7	2.3
Beech Buds	2	3.3	2.0
Cherry Leaves	1	1.7	1.1
Beechnut	2	3.3	0.9
Catkins	2	3.3	0.6
Total Vegetable	45	75.0	59.1
Other			
Misc. Trash and Debris	18	30.0	7.9
			7.9
		Total	100.00

TABLE IIB. SUMMER FOOD HABITS OF MAINE BEARS
(JUNE 16-SEPTEMBER 15)*

Food Item	Frequency	Per cent Occurrence	Per cent Volume
Animal			
Insects			
Ants (incl. eggs)	47	11.6	3.0
Beetles (incl. larvae)	11	2.7	0.3
Bees (incl. wax and honey)	2	0.5	Trace
Fly larvae	4	1.0	Trace
Wasps (incl. larvae)	6	1.5	Trace
Unknown	14	3.5	0.4
Carion	10	2.5	0.3
Unid. Bird Remains	2	0.5	Trace**
Chicken Remains	1	0.2	Trace
Porcupine Hair and Quills	1	0.2	Trace
Deer Hair	3	0.7	Trace
Unidentified Meat	3	0.7	Trace
Unidentified Blood	2	0.5	Trace
Sheep Wool	1	0.2	Trace
Bear Hair	1	0.2	Trace
Snowshoe Hare	1	0.2	Trace
Woodchuck	1	0.2	Trace
Fox Hair	1	0.2	Trace
Unidentified Hair	4	1.0	Trace
Total Animal	106	26.2	4.0

Vegetable			
Apples	39	9.7	19.1
Wild Cherry	85	21.0	16.4
Blueberry	40	9.9	10.3
Grasses and Sedges	41	10.0	9.8
Raspberry and Blackberry	34	8.4	9.3
Hazelnuts	22	5.4	7.6
Oats	62	15.3	6.4
Unidentified Seeds	13	3.2	1.0
Beechnuts	5	1.2	0.2
Spruce (needles)	3	0.7	Trace
Fir (needles)	5	1.2	Trace
Cinquefoil	1	0.2	Trace
Hdwd. Buds	4	1.0	Trace
Clover	3	0.7	Trace
Rhubarb	1	0.2	Trace
Strawberry Seeds	1	0.2	Trace
Dogwood Berries	1	0.2	Trace
Currant	4	1.0	Trace
Barley	3	0.7	Trace
Wintergreen	1	0.2	Trace
High Bush Cranberry	1	0.2	Trace
Sorrel	1	0.2	Trace
Aspen Leaves	1	0.2	Trace
Unidentified Bog Plants	1	0.2	Trace
Potatoes	3	0.7	Trace
Unidentified Roots	3	0.7	Trace
Unidentified Leaves	1	0.2	Trace
Total Vegetable	211	52.2	80.1
Other			
Misc. Trash and Debris (incl. garbage)	87	21.6	15.0
			99.1
Total		Trace Components	.9
		Total	100.0

*Based on 82 stomach and 322 scat analyses, 1953-54

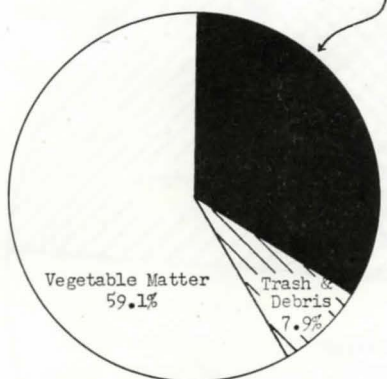
**Trace—less than 0.1%

TABLE IIC. FALL FOOD HABITS OF MAINE BEARS
(SEPTEMBER 16-DECEMBER 15)*

Food Item	Frequency	Per cent Occurrence	Per cent Volume
Animal			
Carrion	3	14.3	9.0
Insects			
Ants	2	9.5	3.4)
Bees (incl. wax and honey)	1	4.9	1.0)
Unidentified	2	9.5	0.2)
Total Animal	10	47.8	13.9
Vegetable			
Beechnuts	7	33.3	29.1
Apple	2	9.5	8.7
Grasses and Sedges	2	9.5	2.6
Acorns	2	9.5	2.5
Hazelnuts	2	9.5	1.9
Unidentified	1	4.9	1.3
Oats	1	4.9	1.0
Bittersweet	1	4.9	0.8
Wild Cherry	1	4.9	0.6
Potatoes	1	4.9	0.2
Fir Needles	1	4.9	0.1
	21	100.0	48.8
Other			
Misc. Trash and Debris	8	38.9	37.3
		Total	100.0

*Based on 12 stomach and 9 scat analyses, 1953-54

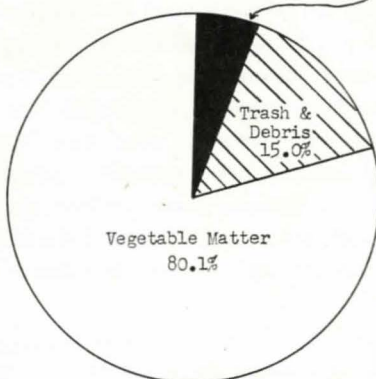
Animal Matter 33.0% (incl. Insects)



SPRING

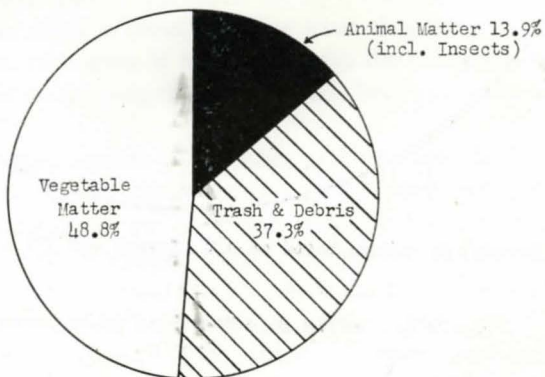
(Based on 14 stomachs, 46 scats)
(April 15 - June 15)

Animal Matter 4.0% (incl. Insects)



SUMMER

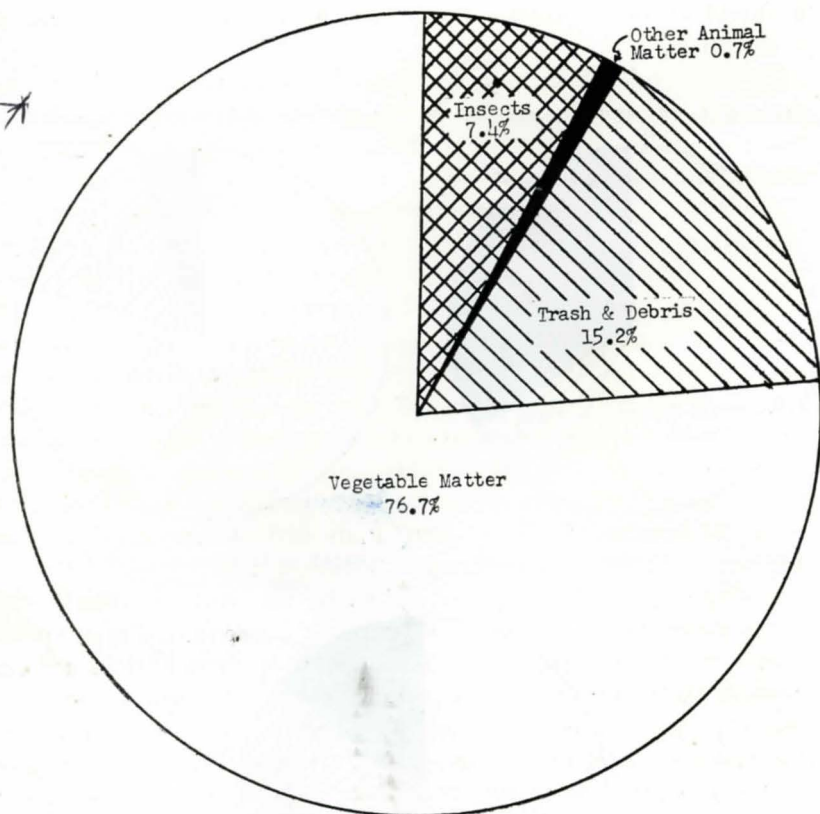
(Based on 82 stomachs, 322 scats)
(June 16 - Sept. 15)



FALL

(Based on 12 stomachs, 9 scats)
(Sept. 16 - Dec. 15)

Figure 2. Seasonal Food Habits of Maine Bears, 1953-54
(Percent by volume)



(Percent by volume based on 108 stomach and 377 scat analyses)

Figure 3. Yearly Food Habits of Maine Bears, 1953-54

Sex and Age Studies

The development of a satisfactory aging technique for bears would enable the determination of age class composition and thus yield valuable data on the rate of increase and general status of the bear population. This appears to be desirable if the bear is to be managed intelligently as the valuable resource it is.

Age and growth studies were made by collecting various measurements and weights from bears which were trapped or shot. The following specific data were collected from 170 specimens: date and location of kill, sex, live weight, total length, length and width of fore and

hind feet, average diameter of upper and lower canines at gum line, and nose pad width.

In attempting to analyse these data it soon became obvious that there existed much variation in the growth rate between individual specimens. It was possible to arrange the data for total length, live weight, and nose pad width in series commensurate with the date of kill. In this case the overlap of measurements of what appeared to be yearlings, 2-year-olds and adults (particularly for females) precluded any accurate correlation with age. The variability in the canine tooth data was even more obvious. The measurements were taken to the nearest 1/10 millimeter. It should be mentioned that the above data were collected by about 10 different workers and consequently the human error in collection of data was correspondingly magnified. It is the writer's belief that measurements of this nature for such a purpose should be collected by a single technician in order to assure consistency.

Another aspect of the age and growth studies was the collection of about 50 bear skulls. Subsequent study of these specimens revealed the same difficulties encountered with the kill data.

During the last few weeks of the study, the work of Laws (1952) and Scheffer (1950) came to the writer's attention. These workers found that microscopically readable annuli or growth rings are laid down in the dentine of canine teeth in some carnivores. The execution of this technique requires considerable laboratory equipment which was not available for this study. However, gross cross sections of both an upper and lower canine tooth were prepared. The sections were taken from the tooth portion with the largest diameter. This appeared to be about at the gum line. Examination of these sections with both hand lens and microscope revealed a definite pattern of concentric annuli within the dentine. The correlation of these annuli with age is hypothesized. The specimens, as prepared with an emery wheel and crocus cloth polishing, were not clearly readable. Cracks in the teeth were present or developed during preparation. It is suggested that if future studies are conducted along these lines, fresh tooth specimens be collected, preserved and prepared in accordance with the techniques utilized by Fisher and Mackenzie (1954) in connection with seal studies in Canada. This method shows promise as a means of aging bears.

Another need in such future studies is a collection of known-age material from wild specimens. It is believed that this material could be collected feasibly by means of a live-trapping and marking program followed up by subsequent collection of data on marked bears from hunters and trappers.

The sex ratio of 236 specimens was 136 males: 100 females or 57.5 per cent males and 42.5 per cent females.

Diseases and Parasites

Information on diseases and parasites was collected incidentally during the study. Several cases of parasitism were recorded. In each case the parasites were identified as round worms *Toxascaris transfuga*. These were found in stomachs during routine autopsy. From 1 to 25 were present in individual bears.

DISTRIBUTION, PAST AND PRESENT

Historians mention the bear as being generally distributed throughout Maine in the early days of settlement. However, as the inroads of civilization and agricultural developments reduced its former haunts, its range rapidly receded to the northern wilderness sections of the State. To some extent at least it now appears that, like the deer, the bear has learned to live with man and is commonly reported 25 to 50 miles southward of what is believed to have been its range of 50 years ago. No definite attempt has been previously made to delineate occupied bear range in Maine. Consequently, past distribution is largely determined from conjecture and observations made by the elder residents in their childhood. No attempt has been made in the present study to plot recessions and extensions of bear range over recent decades.

The present bear range (Figure 4) was compiled through analysis of bounty and damage payments, the combined observations of all project personnel, trapping and hunting records, and the reports of other reliable observers. It will be noted that there are approximately 23,960 square miles of resident bear range. This comprises 78.8 per cent of the State's area excluding inland water.

The non-bear range in Maine consists largely of the southern-coastal agricultural region. The hilly, mountainous topography and a greater percentage of forested area, undoubtedly account for the southward extension of the range in western Maine. It was noted in western Maine that the Androscoggin River Valley appeared to act somewhat as a natural boundary of the range. The bear population is certainly at a much lower density immediately south and west of the River than just north and east of it. It is possible that much of the bear population south of this River may be the result of immigration from the direction of New Hampshire to the west.

STATE OF MAINE

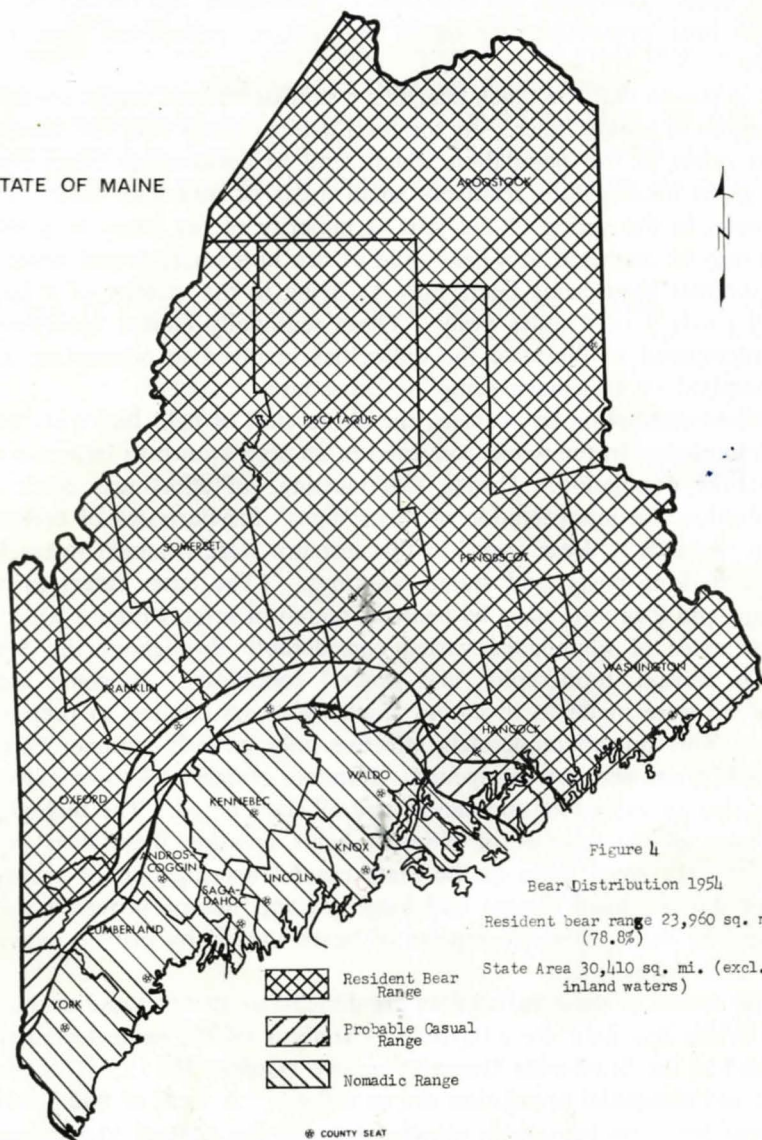


Figure 4
Bear Distribution 1954
Resident bear range 23,960 sq. mi.
(78.8%)
State Area 30,410 sq. mi. (excl.
inland waters)

ABUNDANCE

No wholly satisfactory method has been devised for censusing the black bear. Therefore, the estimates of abundance and density of the Maine bear population are based on multiple procedures described herein.

It is known that the black bear has a unit or "home" range covering a number of square miles. As the food habits change with the seasons, shifts occur in the population which tend to concentrate bears from any given locality into relatively small areas of abundant feed. For example, in the spring of the year, a majority of the bears in a local area may be attracted to a heavy run of fish in a small stream while in the summer these same bears may be living in the vicinity of a large berry patch 3 or 4 miles away. These seasonally limited movements are mentioned to illustrate the difficulties involved in attempting any randomized or systematic sampling procedure.

Before attempting any census, the entire staff of field biologists who were to engage in the work, convened in an area known to have a sizeable bear population. During this meeting, an effort was made to standardize the interpretation of "bear signs" for purposes of estimating abundance. "Bear signs" in this instance were confined to tracks, scats, marking posts, and stump workings. (The latter refers to old stumps and logs torn apart by bears in search of insects Figure 5).

Estimates of abundance varied considerably throughout the State due to terrain, topography, and general conditions. In some areas attempts were made to inventory tracks of bears coming to prepared baits. This proved moderately effective only in early summer before the wild fruits and berries ripened. Random cruises of known mileage were also made by foot and canoe, and all signs noted. The biologists' estimates of the number of different bears crossing these lines were totalled. In some parts of the State careful investigation of summer resort dumps, town dumps and logging camp dumps proved fruitful sources of data. Reliable reports of bears sighted by private individuals were investigated.

The results of these varied data are difficult to interpret and evaluate. The cruise line data are adaptable to analysis by the same techniques utilized in the State-wide Game Inventory (Quick, 1953). The basic data and computed population are as follows. A total of 992.5 miles of bear lines was run which sampled over 20 per cent of Maine townships known to be bear range. Signs of an estimated 417 bears were encountered on these lines giving an average of 2.4 linear miles per bear or 0.42 bear per linear mile. This is designated as the "Game



Figure 5. Typical example of a stump demolished by a bear in search of insects. (Photograph by H. S. Carson)

Density Index". According to the theory utilized, squaring this figure (0.42) yields a bear density of 0.18 bear per square mile or 5.56 square miles per bear. Subsequent multiplication by the area of resident bear range (23,960 sq. mi.) gives an estimated population of 4,224 bears. These figures appear quite conservative and well within probability based on the experience of field workers. The estimate of 4,224 bears does not include bears within the casual or nomadic range indicated under distribution. It is interesting to note that the increased volume of data based on cruise lines since the initial report of this project (Job Completion Report, P-R Project 37-R-3, Job 12) has reduced this estimate from 6,715 to the present figure.

Another method for obtaining an estimate of the bear population which helps to check the other data is as follows:

Assumptions: (1) a stable population and (2) no natural mortality.

Computations:

1. The annual known kill is approximately 1,100
2. Of the 1,100, 22.4 per cent are cubs (observed adult: cub ratio 3.5:1)
3. Thus a minimum population figure would be computed:

$$\frac{22.4\%}{100\%} = \frac{1,100}{\text{Population}}$$

or

$$110,000 \div 22.4 = 4,910$$

4. In a stable population the annual crop (the cubs) equals the loss (kill and natural mortality)
5. In Maine the population is believed to be increasing
6. Thus, the cub crop must exceed the loss
7. Therefore, *the total population necessary to produce a cub crop over 1,100 must be higher than 4,910*

Additional factors and data indicate an actual population figure considerably higher than those computed (4,224 and 4,910). In the case of expanded sample data (4,224), there were an unknown number of bears in the area indicated by casual and nomadic records which was not included in the sample area.

The 22.4 per cent rate of increase (based on 366 records) appears higher than most workers have suspected. If, due to insufficient data,

this figure exceeds the actual rate of increase a larger population would again be indicated. It is possible that females with cubs may be more susceptible to hunting or trapping. If so, it would tend to produce bias toward a higher reproductive rate. From all observations on hand, however, it does appear that the rate of increase in Maine is higher than the 10 per cent proposed by Seton (1928) and the common beliefs of many wildlife technicians. Additional supporting evidence appears in the average litter size of 2.4 young based on 38 observations.

Taking into account all factors and data, the Maine bear population is probably somewhere between 5,000 and 7,000 and increasing. It is interesting to note that in a series of comprehensive game abundance interviews (Spencer, 1953) with 145 woodsmen, 53.7 per cent of the respondents believed that the bear population was increasing, 37.9 per cent thought it was stable and only 8.4 per cent felt it was decreasing.

DEPREDATIONS

Damage Claims and Investigations

Under existing law the State Department of Agriculture pays approved claims for wild animal or dog damage to livestock or poultry, but not for damage to crops. To file a claim, the property owner must report the damage to a local, authorized official (usually first selectman, town manager, or chief of police. The official then investigates and forwards his report with the claim to the Department of Agriculture. If the claim appears irregular, exorbitant or fraudulent the Department conducts a supplemental investigation with its own personnel.

The present study revealed that local authorities investigating claims usually interviewed the claimant for pertinent information and followed this with a visit to the area and inspection of the damage. These investigations were usually made promptly upon report of the damage. However, it should be pointed out that in the case of sheep damage, occasionally the owner did not discover the damage until considerable time after its occurrence. In some instances up to a month may have elapsed between the happening of the damage and its investigation. The investigator in such cases is faced with a very difficult problem in attempting to accurately evaluate the claim.

Frequently, the local investigator is faced with a situation in which damage has obviously occurred but which he is unable to assign to a particular predator. From the standpoint of the law regarding payment it makes no difference and often little effort is made to determine whether dogs or bears caused the damage.

Types of Damage Found

Domestic Animals. The nature of bear damage cases may best be illustrated by a brief résumé of 60 investigations conducted during the study (Figure 6). Of these 60 cases, 42 were livestock and involved sheep, cattle, hogs, goats, and turkeys. Sheep are by far the most commonly attacked animals and accounted for 32 of the investigations. These 32 sheep cases involved from one to 23 sheep and totalled 77 animals reported as killed by bears. Biologists' investigations, made prior

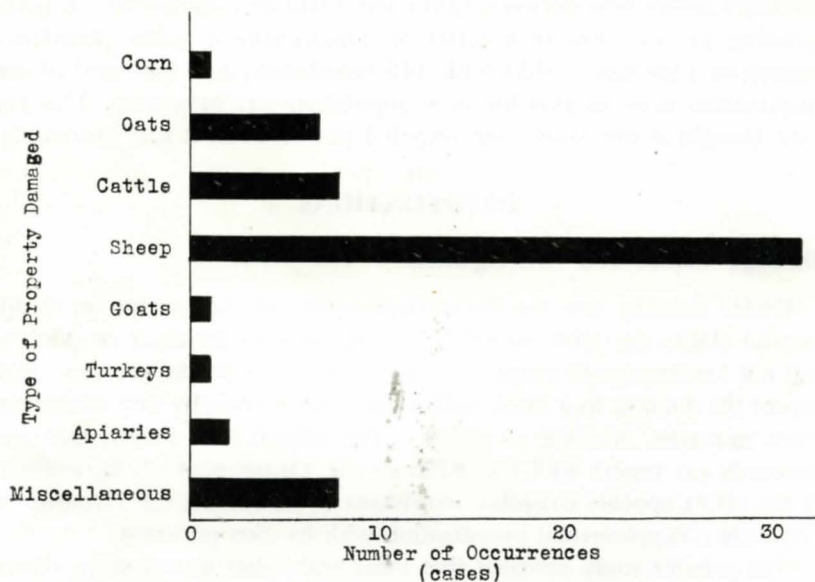


Figure 6. Occurrence of 60 bear damage cases, 1953-54

to receipt of the claims by the Agriculture Department, indicated that, for at least 20 of these sheep, the damage was so old no sound conclusions could be drawn. Of the remainder, 33 were conclusively bear kills, one a natural death, and 23 sheep and one goat appeared to represent a fraudulent investigation by local authorities.

Reports of 8 cases in which 10 cattle were killed or injured showed 5 by bears, 3 unknown, 1 probably human thieves and 1 barbed wire tear. The latter two claims were later rejected by the Agriculture Department. The single cases involving turkeys and hogs were legitimate bear damage and concerned only 1 hog and 2 turkeys. The single goat claimed lost to bears is included with the sheep cases above.

The method of a bear's attack on cattle or sheep apparently varies somewhat with the conditions and probably with individual bears. All of the cattle kills by bears investigated during the study indicated a broken neck. A very severe bruise and various claw marks around the head and neck were typical (Figure 7). It is assumed that the bear breaks the animal's neck with one or more powerful blows of the forepaw. This method of killing has also been observed in grizzly bears. Killing of sheep may apparently be accomplished by a bite through the neck as noted in Virginia (Davenport, 1953) or again by a blow of the forepaw as indicated by some Maine kills. It is conjectured that when in the midst of a flock of sheep a bear may kill several rapidly with forepaw blows whereas when a single sheep is attacked the bite through the neck or spine may be used. Commonly the carcass is dragged or carried to some nearby, concealed location and consumed at leisure. Often the udder (if a female) and brisket and stomach are the first parts consumed. Frequently, the bear will hide and cover part of its kill and return at a later date for another meal. Occasionally bears appear to kill for the sake of killing as little or nothing is eaten. It was found in Virginia (Davenport, 1953) that only adult males turned stock-killers. In Maine, it is believed that females as well as males may kill. One record indicates a killer bear was accompanied by a cub and was assumed to be a female. A female stock-killing bear is also reported from California (Seton, 1928).

In typical situations bear damage to sheep occurs in back pastures well removed from occupied dwellings. Often such pastures are bordered on one or more sides by woods or may even include a wooded section. Fences are usually little or no obstacles to a bear. Sheep are turned into these pastures in the spring and removed in the fall. It has been noted during Maine studies that bears prefer a concealed approach to a feeding area. Thus they will make use of a corner of woods or line of brush leading to a group of livestock or to the edge of an orchard or oat field. Where it is possible for farmers to give this point due consideration in pasturing or planting, it might reduce depredations.

Cultivated Crop Damage. Despite the fact that no claims for bear damage to crops are payable, 8 cases were investigated during the study. Seven of these concerned oat damage and one corn. Corn damage is rare in Maine but oat fields are quite commonly raided by bears. In typical cases bears approach a field of oats (usually in the milk stage) by means of a well concealed approach and feed along the edge. Occasionally they will wallow out 50 yards or so into the field.



Figure 7. Typical example of a cow killed by a bear. Note claw marks on the neck.
(Photograph by the author)

Nuts of the forest

Far more damage results from trampling than actual feeding (Figure 8). The extent of the damage usually depends on the number of bears using the field and the number of times they visit it. In the 8 cases investigated, damage estimates ranged from \$5 to \$50. In one example, where at least 5 bears were known to have been feeding off and on for at least a week, damage was estimated at less than \$15.

Situations similar to those noted in livestock pastures appeared conducive to oat damage. Most fields raided by bears were well away from dwellings and bounded or adjoined by woods. Another factor which apparently influences the overall extent of oat damage is the scarcity or abundance of natural foods at that season in any particular year. In average or bountiful years there is usually an abundance of such items as mast and berries in August and September. The increased reports of oat damage in 1954 is believed to be a direct reflection of failure of the August and September berry and mast crops.

Other crops damaged by bears include blueberries and apple trees. Apple tree damage is usually caused by breaking the limbs and branches of the trees. Most apple damage occurs to wild or abandoned trees and rarely to managed orchards. Some damage to commercial blueberry crops occurs annually. The extent of this is not known but is not believed to reach significant proportions.

Miscellaneous. Various types of property damage, including bee-hives, are grouped under this category. Such cases follow no pattern and are the result of bears being opportunists. Some examples are provided by 8 investigations which involved the following: a car running into a bear (rare), robbing logging camps' meat houses, and various degrees of damage to unoccupied camps and dwellings. Two investigations of apiary damage also gave little evidence of any particular pattern. In one instance, 2 out of 5 hives were destroyed near a backwoods hovel. The owner lived alone in an abandoned one-room schoolhouse and at no place were the woods over 50 feet from the building. The hives were situated around the edge of the clearing. This damage occurred in the spring of 1953 and similar damage recurred in 1954. The surrounding area has a high bear population. The other bee damage case was atypical in that a bear wandered into town and destroyed 7 hives before being shot.

Distribution and Cost of Damage Payments

The distribution of payments for bear damage from 1950 through 1953 (fiscal years) is presented in Figure 9, Appendix B and Appendix C. It will be noted from a study of these and Figure 3 (Bear Distri-



Figure 8. Typical oat damage by bears. Trampling caused far more damage than actual eating of the oats. (Photograph by the author)

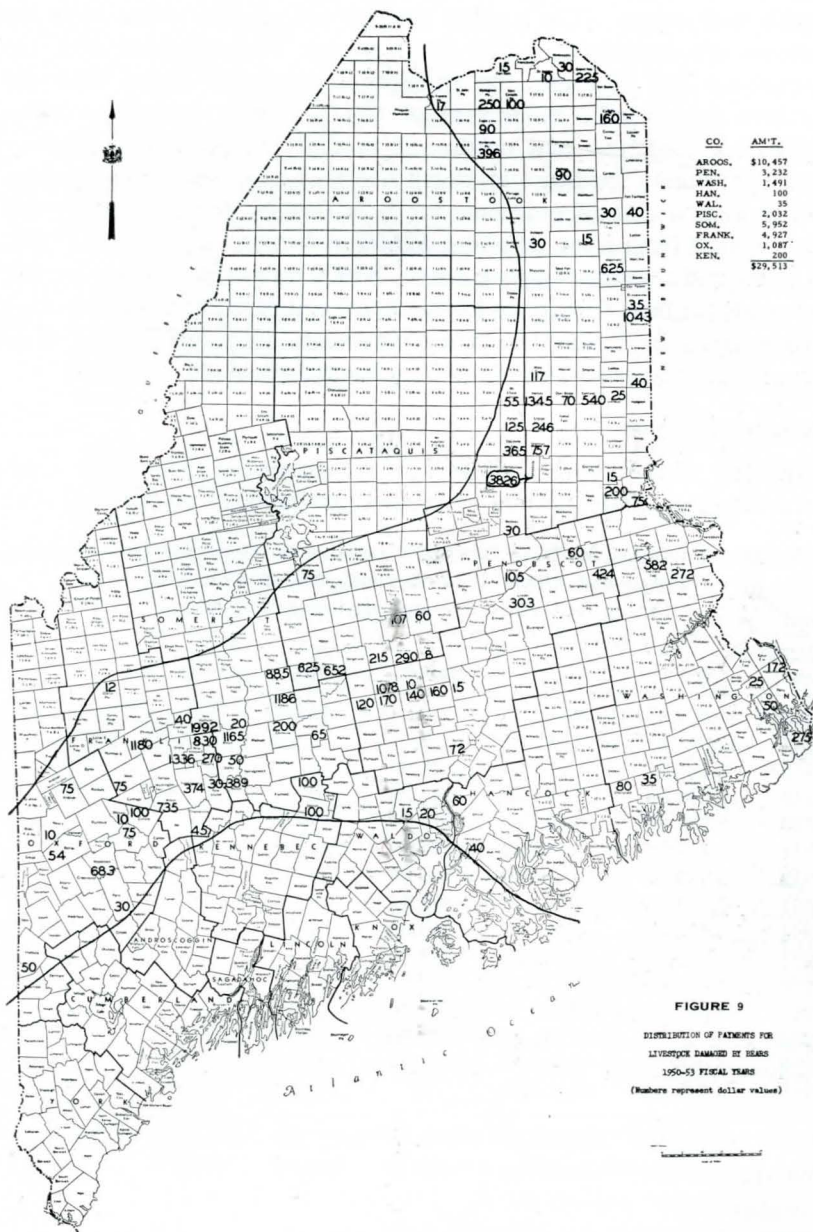


FIGURE 9
DISTRIBUTION OF PAYMENTS FOR
LIVESTOCK DAMAGED BY FLOODS
1950-53 FISCAL YEARS
(Numbers represent dollar values)

bution) that damage is confined to a limited belt extending eastward and northward across the State and constitutes only a portion of the State's bear range. The reasons for this are obvious when land use patterns are considered. The bear damage belt coincides with the transitional belt between the southern agricultural region and the northern timberland. Southward of this belt bears become progressively less numerous and northward in the wilderness area there is little opportunity for bears to attack livestock or create other damage.

The annual cost of payments for bear damage from 1946 through 1960 ranged from a low of about \$2600 in 1957 to a high of \$15,000 in 1946 and averaged approximately \$7600 over the 15 year period. Payments for bear damage to livestock are compared to those for other wild animals in Table III. These payments are made by the State Department of Agriculture from dog license revenues.

Recommendations

In view of the above findings it is recommended that where losses occur, damage claims should continue to be paid.

Table III. Payments for Bear Damage Compared to Those for Dogs, Bobcats, Foxes and Other Wild Animals, Maine 1946-1960
(Sheep and other livestock exclusive of poultry)

Fiscal Year	Bear	Dog	Bobcat	Fox	Other	Total
1946	\$ 15,009.00	\$ 9,120.00	0	\$ 35.00	0	\$ 24,164.00
1947	13,091.00	8,567.00	0	0	0	21,658.00
1948	8,245.00	11,086.00	\$ 180.00	0	0	19,511.00
1949	12,639.00	7,684.00	144.00	0	0	20,467.00
1950	5,729.00	6,497.00	175.00	10.00	0	12,411.00
1951	8,164.00	7,161.00	290.00	317.00	0	15,932.00
1952	9,965.00	10,361.00	105.00	270.00	0	20,701.00
1953	7,601.00	11,335.50	890.50	324.00	\$ 30.25*	20,181.25
1954	3,170.40	7,970.57	260.00	120.00	5.00***	11,525.97
1955	6,699.50	8,269.81	358.00	177.50	12.00***	15,516.81
1956	5,141.00	5,521.72	240.00	50.00	0	10,952.72
1957	2,595.00	6,915.50	167.00	103.00	21.00*	9,801.50
1958	6,022.50	8,581.85	45.00	87.50	4.50**	14,741.35
1959	5,060.50	9,689.72	452.00	47.00	65.50***	15,314.72
1960	4,734.75	10,378.00	0	16.00	40.00***	15,168.75
Total	113,866.65	129,138.67	3,306.50	1,557.00	178.25	248,047.07
Average	7,591.11	8,609.24	220.43	103.77	11.88	16,536.47

* Mink

**Weasel

***Coon

BOUNTIES

The effect, value, and desirability of bounties has been discussed and studied for many years. Commonly bounties have been established for the purpose of reducing a predator or vermin type of population with the belief that they would alleviate damage caused by the species involved. In some cases it has been in the interests of protecting more desirable game and in others for the protection of human property (livestock, etc.). It is generally conceded that the serious disadvantages of bounty systems greatly outweigh the limited advantages.



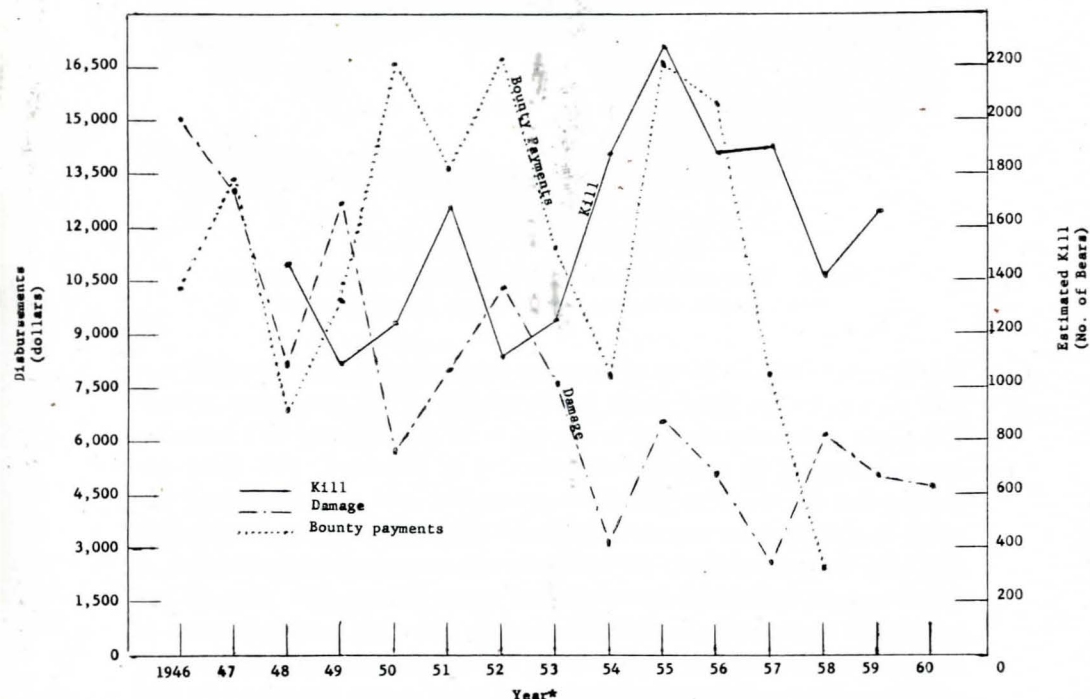
Figure 10. Bear cub killed for bounty in Oxford County, February, 1954, weight 4¼ lbs. (Photograph by the author)

Briefly, arguments in favor of bounties are that: (1) at least under certain circumstances there is an increased kill of the predatory animal; (2) some additional revenue is offered rural populations; (3) some increased interest in trapping and hunting is provided; (4) there are limited but questionable educational benefits; and (5) additional material is provided for scientific studies. Objections to the bounty system may be summarized: (1) they do not encourage concentration of effort against individual livestock and game killers; (2) they do not encourage work when and where needed; (3) they permit hunters or trappers to concentrate their efforts on certain seasons of the year, which may not correspond to periods of most severe damage; (4) they do not provide means of meeting emergencies; (5) they lead to various

fraudulent practices; and (6) a bounty must be high to be effective in reducing a predator population (Adapted from Latham, 1951).

In considering bears, a species of low breeding potential, it seems more likely that a bounty does act as a limiting factor on population growth. That a \$15 bounty does not reduce a bear population or even entirely prohibit its increase is amply evidenced by the present thriving condition of the Maine bear herd. Thus if a bounty is to achieve reduction of the bears in Maine it appears necessary to increase it to some unknown point at greatly added expense. Unfortunately, it is not as simple as this and additional factors must be considered. Perhaps prime among these is the question of whether or not a bounty will reduce the damage. Present evidence shows that it does not. It is an accepted fact that only certain bears ever develop the stock-killing habit. Consequently, any number of bears may be trapped and bounties collected without alleviating the damage until the destructive in-

Figure 11. Trends in Bear Harvest, Damage and Bounties
1946-1960



* Fiscal for bounty and damage; calendar for kill.

dividual is taken. Conversely if the nuisance bear is taken first any additional bounties are wasted. Also under a bounty system it is natural for trappers to concentrate their efforts in areas of high populations. These do not necessarily coincide with areas sustaining extensive damage. It will be noted from Figure 11 that many bounties have been paid on bears well removed from any damage area.

A comprehensive analysis and report on all bounties and damages was prepared in conjunction with P-R Project W-37-R-2, by N. W. Fellows, Jr. To prevent repetition, only salient features are presented herein.

TABLE IV. ANNUAL COST OF BEAR BOUNTIES; MAINE 1946-1958.

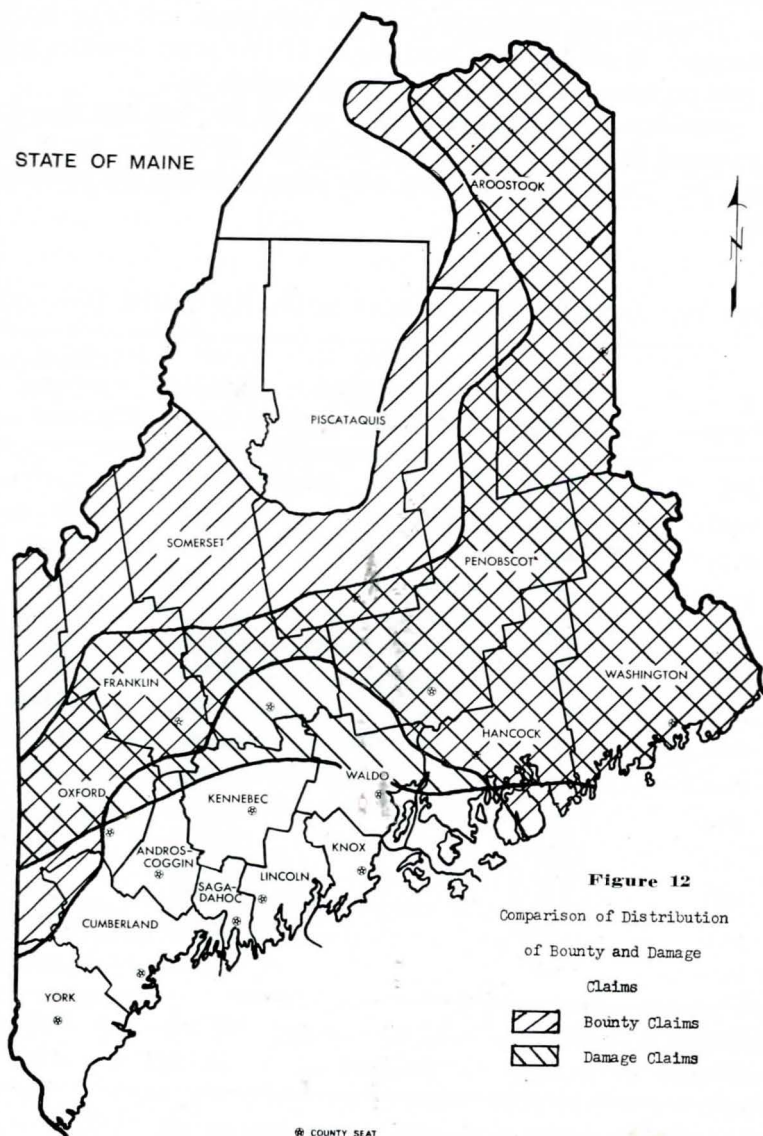
Year ¹	No. Bears		Bounty Cost	Calculated Kill (Questionnaire)
1946	1,036	@ 10.00	\$ 10,360	—
1947	898	@ 15.00	13,470	—
1948	446	"	6,690	1,450
1949	672	"	10,080	1,100
1950	1,089	"	16,335	1,225
1951	895	"	13,425	1,690
1952	1,096	"	16,440	1,118
1953	759	"	11,385	1,250
1954	519	"	7,785	1,860
1955	1,074	"	16,110	2,275
1956	1,034	"	15,510	1,875
1957	536	"	8,040	1,900
1958	159 ²	"	2,385 ²	1,410
1959	—		—	1,675
Total	10,213		148,015	18,828
Average	838 ³		12,136 ³	1,569

¹ Fiscal (July 1-June 30) for bounties; calendar year for kill.

² Includes 44 days only, from July 1-August 13 after which bounty payments ceased.

³ Exclusive of 1958.

STATE OF MAINE



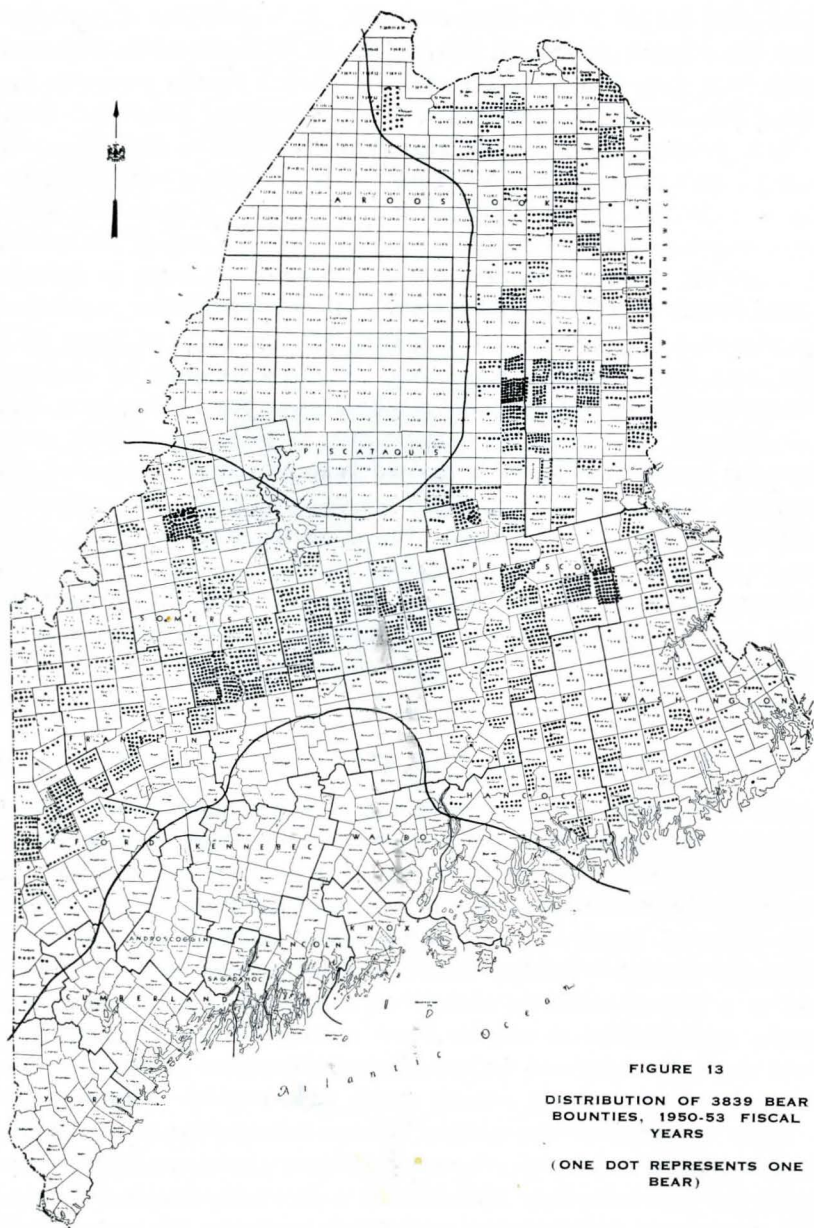
Between 1946 and August 13, 1957 over 10,000 bears were bountied at a cost of more than \$148,000 (Table IV). This averaged in excess of \$12,000 for about 840 bears annually. It is gratifying to note that since the original printing of this bulletin in 1955 the 98th, 99th and 100th State Legislatures have seen fit to abolish bounty payments for bear. This represents an estimated savings exceeding \$46,000 to date.

Many people who favored the bear bounty felt that its removal would shortly result in rapid increase in bear numbers with a subsequent increase in damage claims. Though it has been but a short four years since abolishment of the bounty, records of damage and of the annual bear harvest indicate that there *has not* been an increase in damage claims despite a general trend toward a slightly larger bear population (as indicated by the gradually increasing kill illustrated in figure 10.) The latter fact in itself is interesting. It might logically be assumed that removal of the bounty would result in fewer bears being harvested. Yet Table IV and Figure 10 indicate that, in three out of four years since the bounty ceased, the estimated bear harvest has exceeded the long term average. Obviously, bears are being harvested in comparable numbers—bounty or no bounty. Based on the foregoing facts there can be no valid reason for reinitiating the bear bounty. In fact all evidence indicates that wild animal bounties of any nature have no place in the Pine Tree State. The wisdom of recent legislatures in keeping the black bear—great game animal that he is—bounty free, is unquestionable.

RECREATIONAL AND ECONOMIC VALUES

The recreational value of the bear in Maine is impossible to assess in dollars and cents. Bears have a strong public appeal and in Maine, as elsewhere, they symbolize the deep woods to many, many people. The black bear is the mascot and symbol of the University of Maine. The universal appeal of bears is capitalized on in Maine's publicity campaign through "Smokey", the fire-fighting bear used on posters and as a talking, animated model. A number of summer resorts advertise opportunities to observe bears nearby and numerous tourists, local residents, and photography fans avail themselves of these chances. The bear thus has a high esthetic value. *Beauty in Nature*

Many resident and non-resident hunters consider the bear a highly desirable game trophy, worthy of their most strenuous efforts. The writer has seen more than 30 hunters in a deer camp forget about deer and concentrate on bears when one of their party was fortunate enough to bag a bruin. Frequently, he has heard hunters avow they'd rather



shoot one bear than all the deer in the State. Nearly all sporting camps in the bear range offer the chance of bagging a bear as an additional attraction though little emphasis is actually placed on bear hunting. The major reason for the latter situation is the low possibility of success. Very few guides have sufficient knowledge of bear habits and haunts to offer their "sports" more than a remote possibility of getting a shot. Both bear and deer hunting in Maine are largely still-hunting propositions. The bear is extremely wary and difficult to bag in this manner. In the past 4 or 5 years, "hound-dog" men have shown increasing interest in hunting bears with their packs. Although success has been low to date, this method will probably become more popular and successful as experience is gained. Detailed knowledge of the hunting area and the habits of the bears in it will contribute to greater success in hunting with dogs.

Unfortunately, the value of bear meat and hides is little realized among Maine residents. Through association and familiarity with some of the animal's more unpleasant characteristics a stigma has become attached to eating bear meat. The meat of a young animal, properly killed, dressed, and prepared, is highly palatable. Many people have enjoyed bear steak without knowing what they were eating. The demand for hides, of course, is largely nil with the exception of trophy seekers. There is no denying that a well-made bear rug adds something to a man's den.

Negative economic aspects of bounties and damage claims have already been discussed. It appears they can be much reduced.

Additional indication of the economic value of the black bear is the annual traffic and sale of trapped bears to homeward bound sportsmen. Since \$15.00 bounties are paid over most of the State, the trapper can collect his bounty, then sell the bear to a non-resident for \$25.00 to \$100.00. In Franklin County alone, at least 40 bears were sold during the 1953 hunting season. The price ranged from \$20 to \$100 and averaged \$35. The bears ranged from 38 to 375 pounds, and averaged 125 pounds dressed weight. Such is the market for bears that a number of professional trappers or hunters take bears throughout the year and hold them in cold storage for sale during the season.

Although the recreational and economic value of the bear in Maine is appreciable, it in no way approaches its real potential. The laws affecting bears indirectly class them as vermin by paying a bounty and providing no seasons, bag limits, or other restrictions as to the time or method of taking. Sound publicity on the sporting potential of the bear would undoubtedly result in greatly increased recreational and

related economic values. Other states have found this to be a sound economic and biological practice.

RECOMMENDATIONS

The short 18-month period covered by the black bear investigation was too brief to permit collection of sufficient data and information on which to base a comprehensive management plan. Ample data, however, have been gathered to permit the formulation of certain general management measures particularly those concerned with corrective legislation. If such measures are carried out, they will lead naturally to a need for further management based on additional research. Some aspects, such as food habits, distribution, bounties and damages have been adequately investigated for the present. Other phases such as population trends, abundance estimates, aging techniques, unit range, and others require additional research. With these factors in mind the following recommendations are made:

1. In view of its excessive cost and failure to accomplish any desirable objective the bounty on bears should be permanently abolished throughout the State.
2. Where losses occur damage claims should continue to be paid.
3. The trapping and sale of bears in this State should continue to be allowed until such time as enough hunters are interested and capable of obtaining an adequate harvest.
4. The bear should be publicized as a potential game and trophy species.
5. The study should be continued to form a permanent part of the State's big game studies. Work should be directed to correct some of the inadequacies mentioned above. Thought should be given to utilizing research facilities at the University of Maine to perform research on selected phases of the problem.

SUMMARY

1. Distribution studies of the black bear in Maine showed that approximately 79 per cent of the State supports a resident bear population. Casual and nomadic range cover an even larger area.
2. No reliable method was devised for measuring the density or relative abundance of the bear. State-wide population estimates were computed by means of the technique utilized in the game inventory and on a basis of the observed increase rate of 22.4 per cent. These techniques yielded minimum estimates of 4,229 and 4,910 bears respectively. The actual population was estimated to be between 5,000 and 7,000 in the State.
3. An adult: cub ratio of 3.5:1 or 22.4 per cent cubs was computed on a basis of 366 records.
4. The sex ratio of 236 specimens was 136 males: 100 females or 57.5 per cent males and 42.5 per cent females.
5. The average litter size, compiled from 38 records, was 2.4 cubs per litter.
6. A series of skulls and kill data were collected and analysed in an attempt to determine an aging technique. The ranges of variability of individual bears were found to preclude aging with the available information.
7. Gross cross sections of the canine teeth showed a pattern of annuli, which are probably related to age. With refined techniques and further study this method of aging shows promise.
8. Gross food habits were studied and the diet compiled on a basis of 377 scat and 108 stomach content analyses. The year-round food habits consisted of 8.1 per cent animal matter (including 7.4 per cent insects), 76.7 per cent vegetable matter and 15.2 per cent other material. These data were presented in tabular form.
9. Bear depredations occurring during the study were investigated. The most significant damage by bears was the killing of sheep. Occasionally evaluation was difficult due to time lapse between damage and investigation. Damage usually occurred in more remote rural areas to unprotected flocks grazing in or near the woods. No evidence of deer being killed by bears was found during the course of the study.

10. The recreational and esthetic values of the bear in Maine were discussed. Many sportsmen have a high regard for the bear as a game species and are willing to spend sizeable sums to hunt it.
11. The distribution and economics of bear damage and bounty claims were analyzed. The data are presented in table and map form. Findings indicate that the bounty costs the State an expense in excess of \$12,000 yearly and that bear damage costs average over \$10,000 annually.
12. Recommendations were made pertinent to future studies of the bear and legislative measures to improve management of the bear in Maine. They include the following:
 - a. removal of the bounty,
 - b. continuance of payment of damage claims,
 - c. publicizing the bear as a potential game and trophy species,
 - d. continuing to allow the trapping and sale of bears until such time as an adequate harvest can be obtained by hunting only,
 - e. continuation of research investigations.

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APPENDIX A

COMMON AND SCIENTIFIC NAMES USED IN THE TEXT

INSECTS

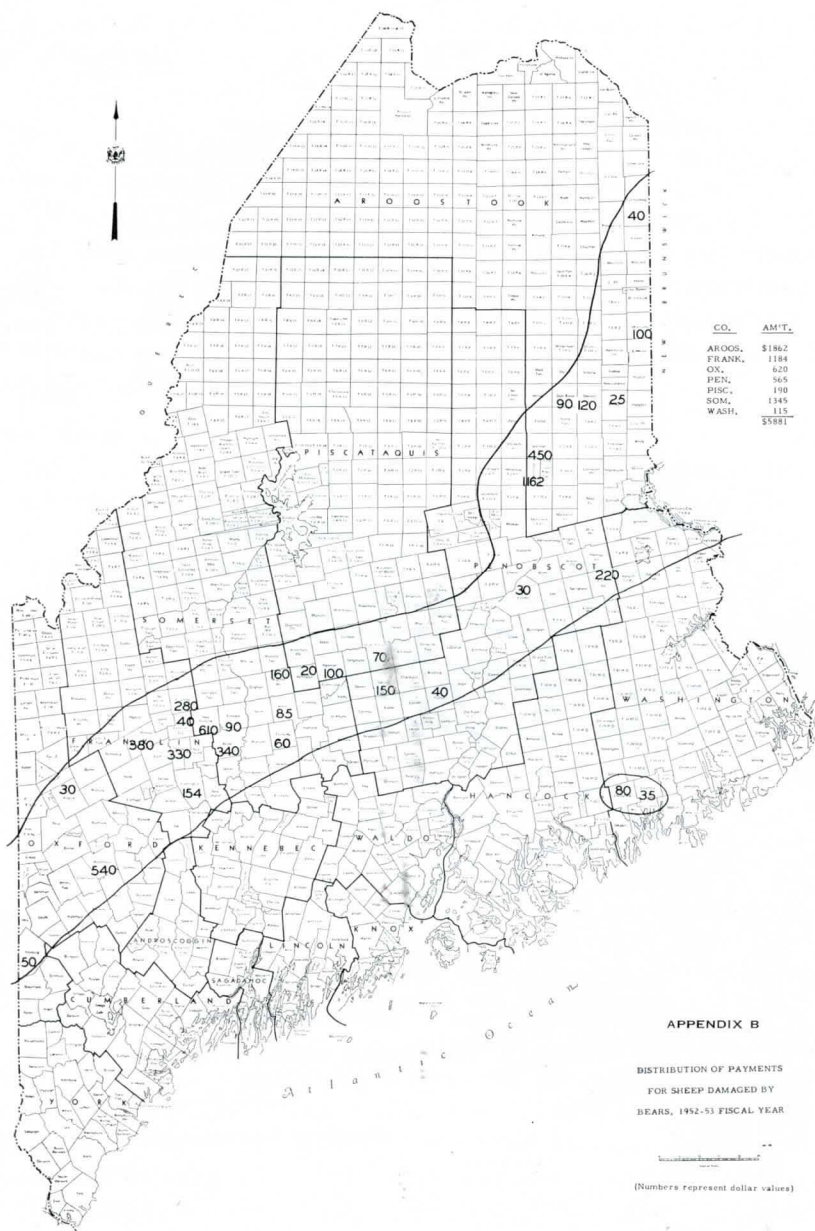
Ants	(<i>Camponotus</i> sp.)
Bees	(<i>Hymenoptera</i>)
Wasps	(<i>Hymenoptera</i>)
Fly larvae	(<i>Diptera</i>)
Beetles	(<i>Coleoptera</i>)

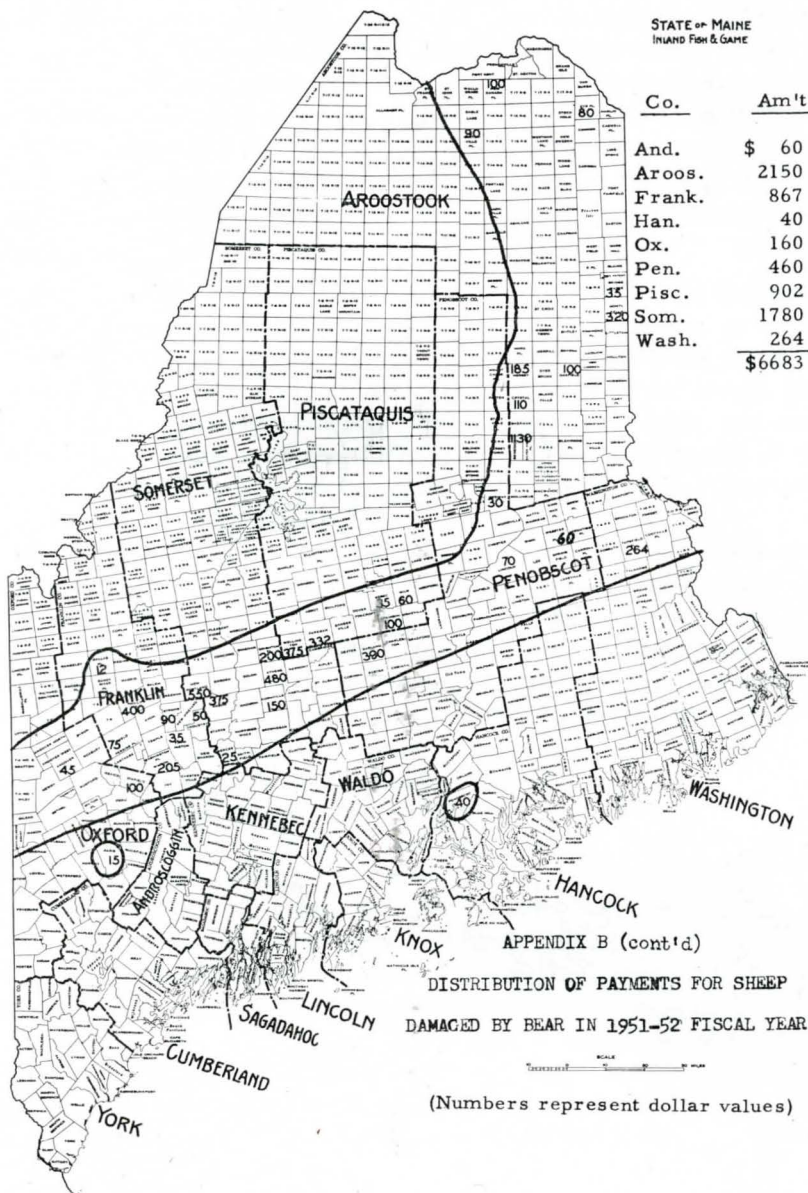
MAMMALS

Snowshoe Hare	(<i>Lepus americanus</i>)
Red Squirrel	(<i>Sciurus hudsonicus</i>)
Porcupine	(<i>Erethizon dorsatum</i>)
Deer	(<i>Odocoileus virginianus</i>)
Woodchuck	(<i>Marmota monax</i>)
Red Fox	(<i>Vulpes fulva</i>)

PLANTS

Balsam Fir	(<i>Abies balsamifera</i>)
Grasses	(<i>Gramineae</i>)
Sedges	(<i>Cyperaceae</i>)
Beech	(<i>Fagus grandifolia</i>)
Clover	(<i>Trifolium</i> sp.)
Wild Cherry	(<i>Prunus</i> sp.)
Blueberry	(<i>Vaccinium</i> spp.)
Raspberry	(<i>Rubus idaeus</i>)
Beachberry	(<i>Rubus</i> sp.)
Hazel	(<i>Corylus</i> sp.)
Spruce	(<i>Picea</i> sp.)
Cinquefoil	(<i>Potentilla</i> sp.)
Strawberry	(<i>Fragaria</i> sp.)
Oats	(<i>Avena sativa</i>)
Barley	(<i>Hordeum</i> sp.)
Dogwood	(<i>Cornu</i> sp.)
Currant	(<i>Ribes</i> sp.)
Wintergreen	(<i>Gaultheria procumbens</i>)
High Bush Cranberry	(<i>Virburnum opulus</i>)
Aspen	(<i>Populus</i> sp.)
Sorrel	(<i>Rumex</i> sp.)
Bittersweet	(<i>Celastrus scandens</i>)
Apples	(<i>Malus</i> sp.)
Rhubarb	(<i>Rheum rhaponticum</i>)
Potatoes	(<i>Solanum tuberosum</i>)





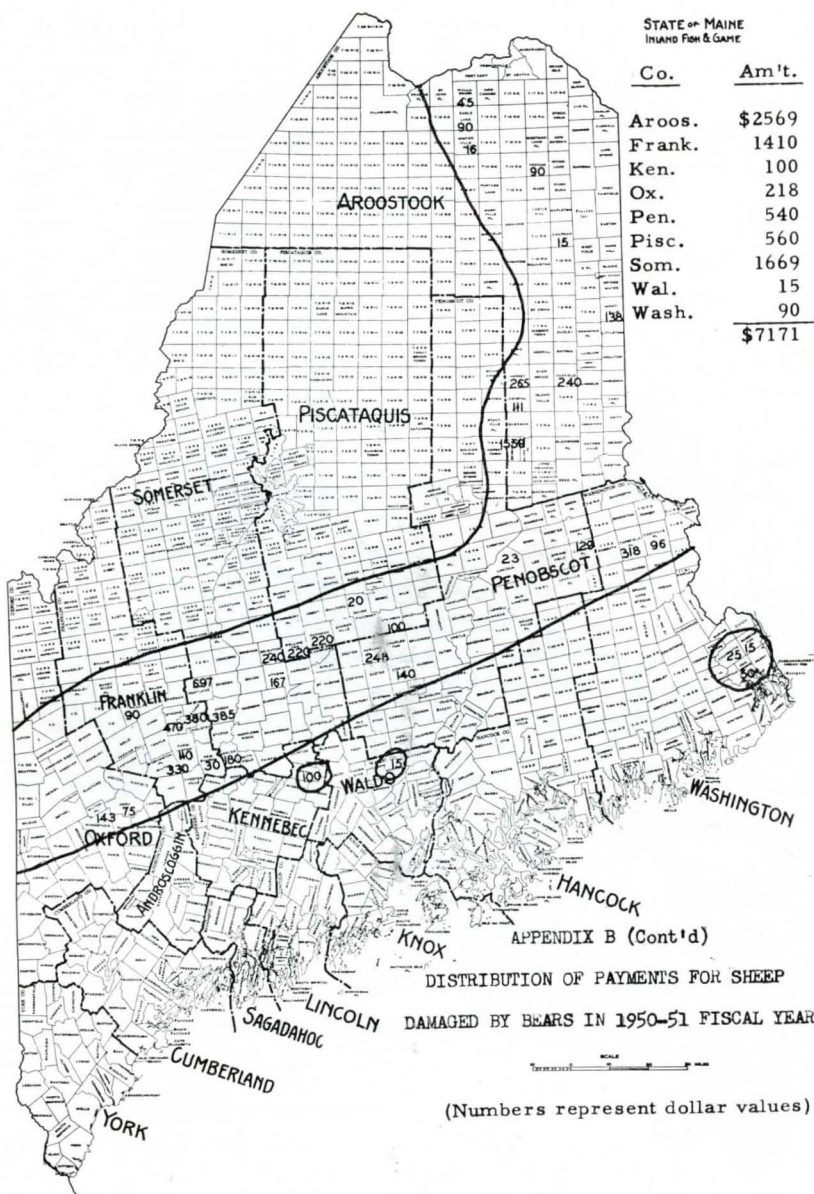
STATE OF MAINE
INLAND FISH & GAME

Co.	Am't.
And.	\$ 60
Aroos.	2150
Frank.	867
Han.	40
Ox.	160
Pen.	460
Pisc.	902
Som.	1780
Wash.	264
	<u>\$6683</u>

APPENDIX B (cont'd)

DISTRIBUTION OF PAYMENTS FOR SHEEP
DAMAGED BY BEAR IN 1951-52 FISCAL YEAR

(Numbers represent dollar values)

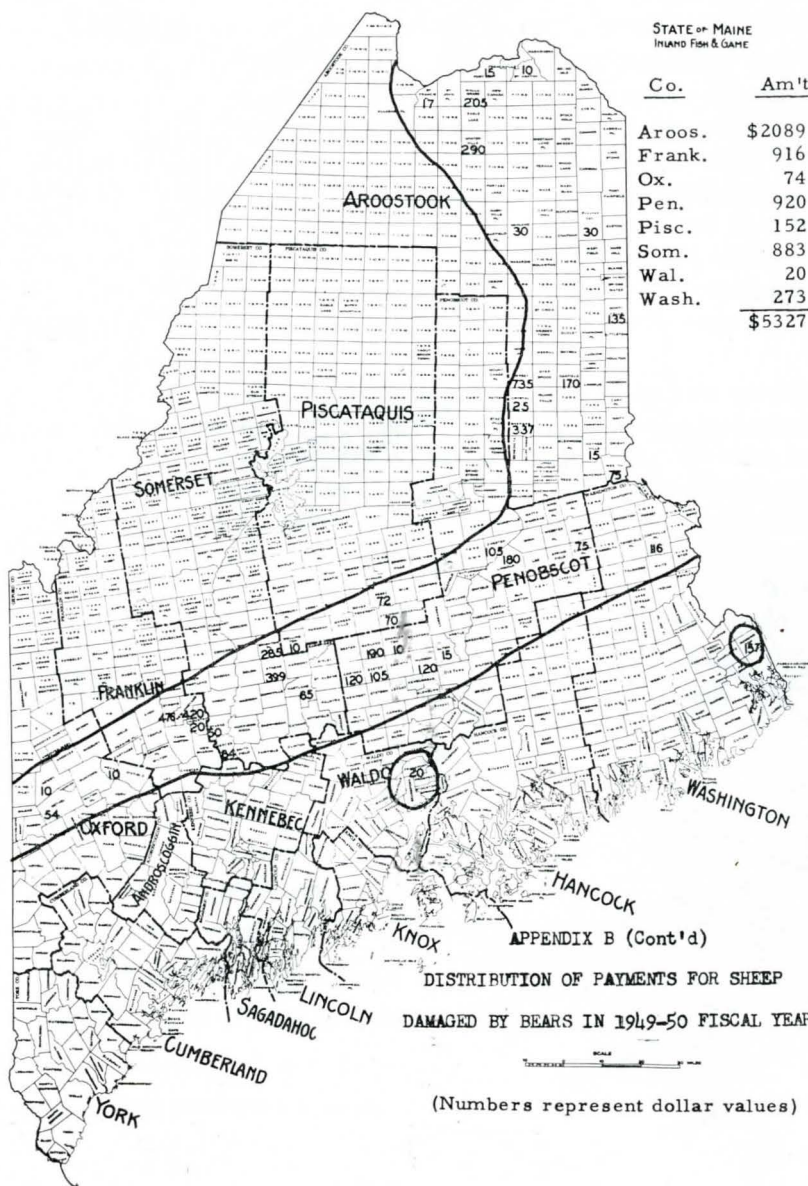


STATE OF MAINE
INLAND FISH & GAME

Co.	Am't.
Aroos.	\$2569
Frank.	1410
Ken.	100
Ox.	218
Pen.	540
Pisc.	560
Som.	1669
Wal.	15
Wash.	90
	<u>\$7171</u>

APPENDIX B (Cont'd)
DISTRIBUTION OF PAYMENTS FOR SHEEP
DAMAGED BY BEARS IN 1950-51 FISCAL YEAR

(Numbers represent dollar values)



STATE OF MAINE
INLAND FISH & GAME

Co.	Am't.
Aroos.	\$2089
Frank.	916
Ox.	74
Pen.	920
Pisc.	152
Som.	883
Wal.	20
Wash.	273
	<u>\$5327</u>

APPENDIX B (Cont'd)
DISTRIBUTION OF PAYMENTS FOR SHEEP
DAMAGED BY BEARS IN 1949-50 FISCAL YEAR

(Numbers represent dollar values)

APPENDIX C. PAYMENTS FOR BEAR DAMAGE TO LIVE-
STOCK OTHER THAN SHEEP FOR FISCAL YEARS
1950, 1951, 1952, and 1953

		1950	
<i>Aroostook County</i>			
Pittsfield	1 heifer		\$125
<i>Penobscot County</i>			
Bangor	10 pigs		\$ 57
Bangor	1 calf		15
Exeter	1 heifer		65
Garland	1 heifer		100
Greenville	1 pig		25
Mt. Chase	1 steer		55
			COUNTY TOTAL
TOTAL 1950			\$317
		1951	
<i>Franklin County</i>			
Kingfield	1 steer		\$150
Kingfield	4 heifers		315
Farmington	1 goat		25
Wilton	1 heifer		200
			COUNTY TOTAL
			\$690
<i>Kennebec County</i>			
Clinton	1 heifer		\$100
<i>Piscataquis County</i>			
Greenville	1 pig		\$50
Orneville	1 heifer		8
			COUNTY TOTAL
			\$58
<i>Somerset County</i>			
Mercer	1 calf		\$100
<i>Washington County</i>			
Codyville	1 bull		\$ 60
Lubec	1 heifer		150
			COUNTY TOTAL
TOTAL 1951			\$210

1952

Aroostook County

Moro Plt.	1 bull	\$117
Monticello	1 heifer	200
Hersey	1 heifer	100
Monticello	7 pigs	150
Cyr Plt.	1 calf	80

COUNTY TOTAL \$647

Franklin County

Chesterville	1 calf	\$ 45
New Vineyard	1 pig	30
Phillips	1 heifer	150

COUNTY TOTAL \$225

Oxford County

Paris	1 calf	\$15
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Penobscot County

Stacyville	3 pigs	\$225
Stacyville	1 heifer	125
Stacyville	1 calf	15

COUNTY TOTAL \$365

Piscataquis County

Atkinson	1 calf	\$ 20
Dover	1 calf	125

COUNTY TOTAL \$145

Somerset County

Athens	2 calves	\$55
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TOTAL 1952 \$1,452

1953

Aroostook County

Bancroft	1 cow	\$200
Grand Isle	1 cow	225
Hersey	1 calf	60
Houlton	1 calf	40
Madawaska	1 calf	30
Westfield	5 heifers	500
Weston	1 calf	300

COUNTY TOTAL \$1355

Franklin County

Industry	1 heifer	\$200
Phillips	1 heifer	200
		<hr/>
COUNTY TOTAL		\$400

Penobscot County

Patten	1 calf	\$125
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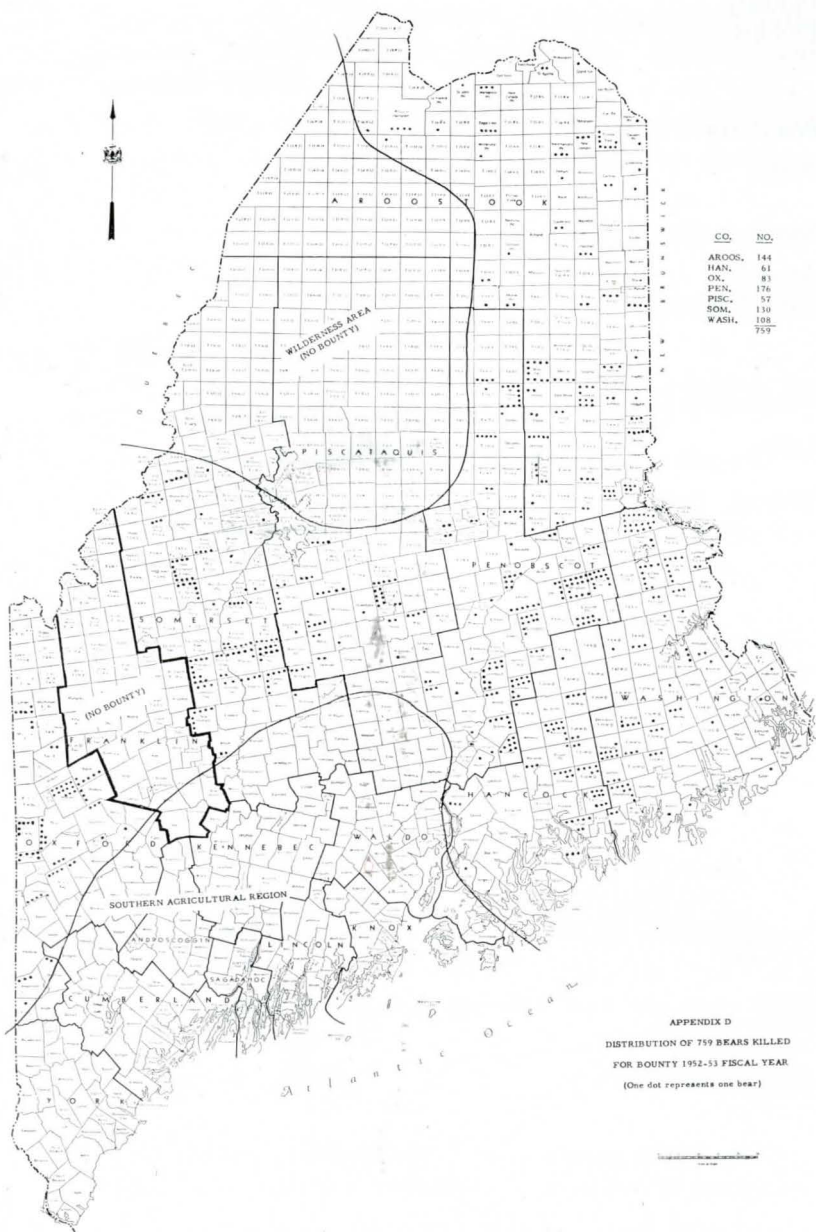
Somerset County

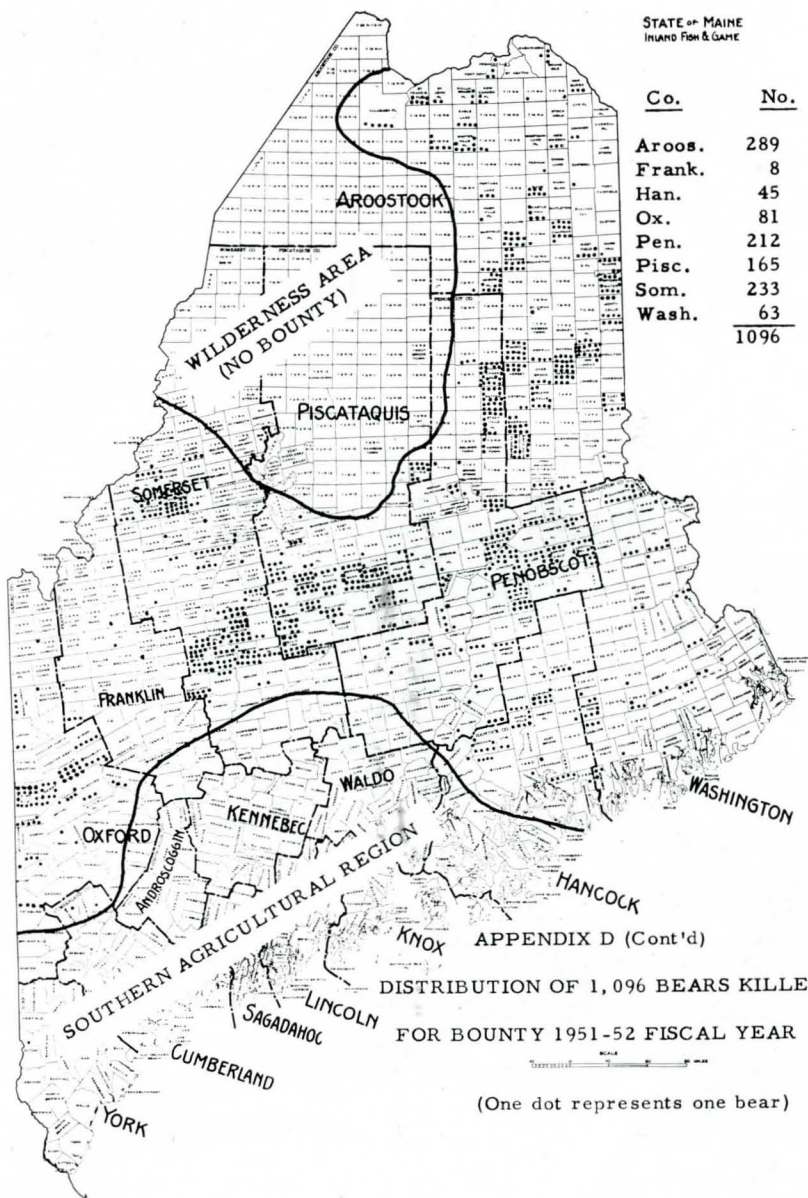
Athens	1 heifer	\$ 80
New Portland	1 heifer	125
		<hr/>
COUNTY TOTAL		\$205

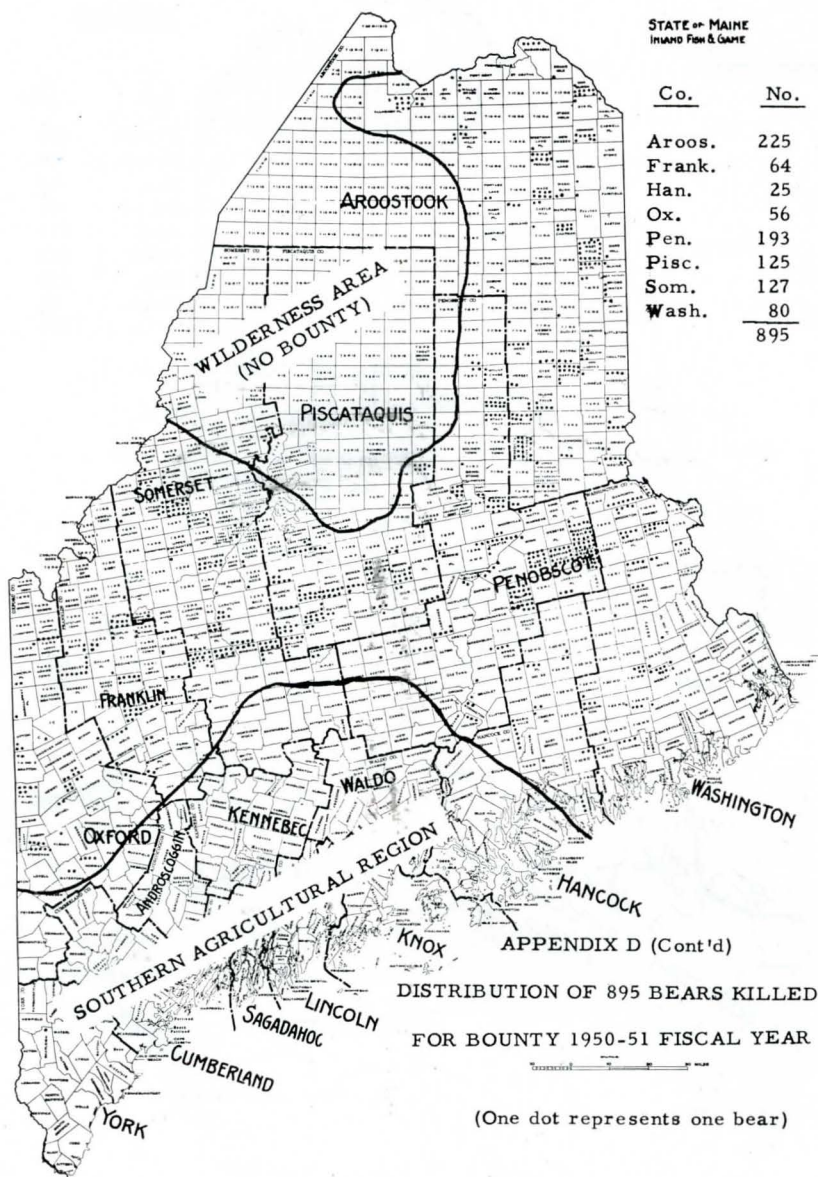
Washington County

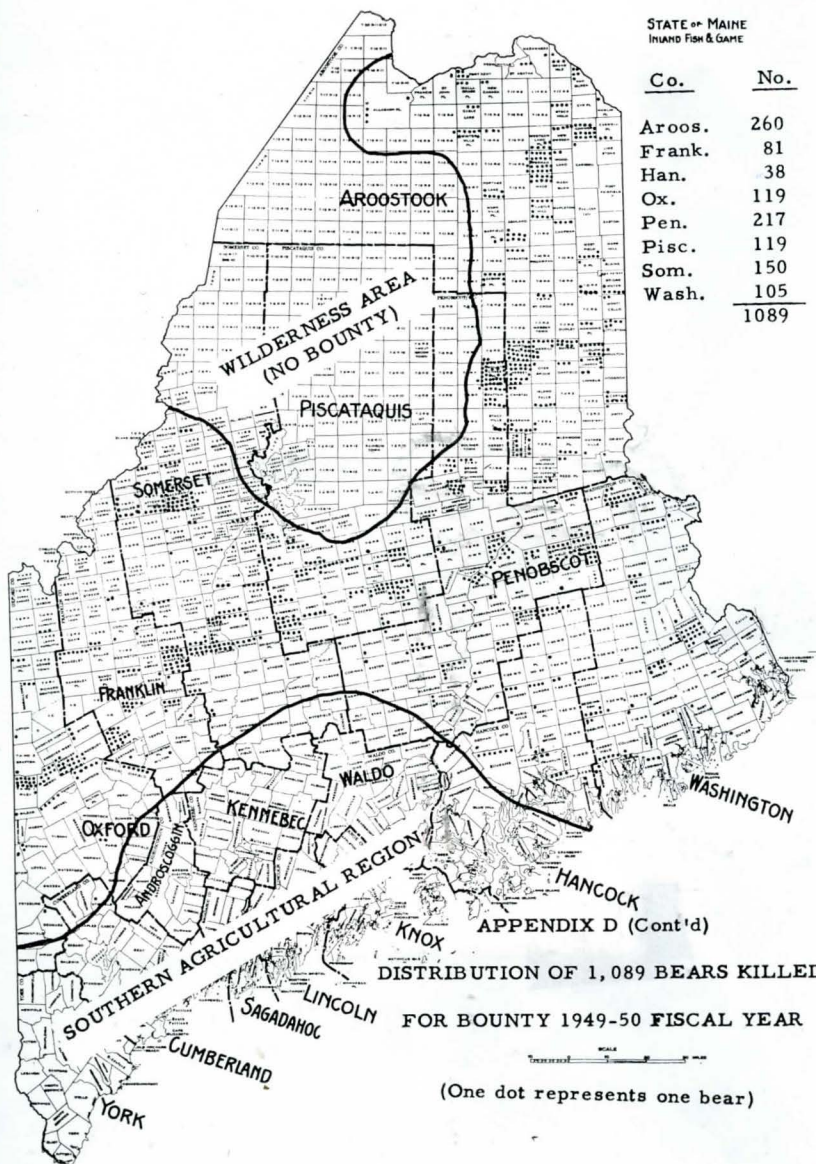
Lubec	1 heifer	\$125
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TOTAL 1953 \$2,210









Date Due

JA 24 '66

JA 9 '67

MR 9 '67

MR 20 '69

DE 24 '69

FE 12 '70

SE 18 '70

MY 14 '73

NOV 25 1974

MAY 17 1975

NOV - 3 1975

MAR 21 1977

Demco 293-5

